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THE STOPPING OF THE CLOCK.

Surprising falls the instantaneous calm,
The sudden silence in my chamber and I;
I starting, lift my head in half alarm—
The clock has stopped—that's all.

The clock has stopped! Yet why have I no
found
An instant feeling almost like dismay?
Why note its silence sooner than its sound?
For it has ticked all day.

So may a life beside my own go on,
And such companionship unneeded keep;
Companionship scarce recognized till gone,
And lost in sudden sleep.

And so the blessings Heaven daily grants
Are in the very consciousness forgot;
We little heed what answers our wants—
Until it answers not.

A strenuous faith on familiar ways,
As if some paths were gone beyond recall—
Something with aught of linked with all our
days
Some clock has stopped—that's all.
—George H. Connor, in *Poet's Companion*.

TORNADOES, HAILSTORMS AND WATERSPOUTS.

At this season of the year, when storms of limited area and great violence are apt to occur, we are equally apt to suffer from outbreaks of newspaper meteorology which are sometimes almost as appalling as the phenomena they attempt to explain. We may be excused, therefore, for assuming that the subject is one of popular interest, and for compiling some of the more significant and certain results of observation and scientific deduction with regard to the origin, conditions and behavior of this class of storms.

A favorable opportunity for doing this is furnished by the recent publication of the tenth appendix to the report of the Superintendent of the United States Coast and Geodetic Survey for 1878, containing the second part of Mr. William Ferrel's researches on cyclones, tornadoes and waterspouts, in which the theory of cyclones is mathematically discussed at great length, with a comparison of the results thus obtained with the facts of observation. We may safely draw from this treatise such information as may seem of interest to landmen at this time, with reasonable confidence that we shall not be misled with respect either to facts or inferences. Although largely similar to cyclones and governed by the same general principles, tornadoes form a distinct class of meteoric phenomena. The initial temperature conditions which give rise to cyclones generally extend over large areas. The conditions of tornadoes depend rather upon vertical relations of temperature, under which the unstable equilibrium of the atmosphere is liable to be violently disturbed by slight local changes of temperature causing the under strata of air to burst up through the overlying strata. A cyclone is usually a broad, flat, gyrating disk of atmosphere, very many times greater in width than in altitude; a tornado may be regarded as a column of gyrating air in which the altitude is several times greater than its diameter. The enormous velocities of the ascending currents in a tornado appear to be caused by the difference between the gyratory velocities above and those very near the earth's surface. The former largely prevent the air from pressing in to fill up the partial vacuum near the center, while the smaller gyratory velocities near the earth allow it to rush in there to supply the draught. The tendency of friction is constantly to use up the energy of gyration so that the tornado cannot continue very long. The ascending currents carry up an enormous amount of aqueous vapor into the upper regions of the air, where it is condensed and produces the heavy rains observed in connection with tornadoes. An ascending current of sixty meters a second, which cannot be unusual in tornadoes, would furnish, under extreme conditions of air saturation, four inches of rain a minute. If it were to fall directly back, with such an ascending velocity, however, no rain could so fall. It would be thrown outside the vortex, giving an immense though lighter fall of rain over a larger area, especially if the tornado in its irregular progressive motions should remain stationary or nearly so for several minutes. If the velocity of the ascending current is not so great that the water is all carried up to where the currents are outward from the vortex, and yet great enough to prevent its falling back, there may be in the lower part of the cloud a vast accumulation of rain, prevented from falling by the ascending currents and from being dispersed by the inflowing currents from all sides toward the vortex. When the sustaining energy of the tornado is exhausted by friction or by the weight of water accumulated in the cloud, the water is liable to fall in mass, causing what is called a cloud burst. This is especially liable to occur in mountainous regions, for contact with a mountain must greatly interfere with the gyratory motion of the tornado and the inflowing currents below, and tend to break up the system at once and let the whole cloud drop suddenly.

The water in cloud bursts is generally poured down. Long before the ascending currents are reduced so as to allow the water to fall in drops it seems to

collect at certain places and force its way in a solid stream down through the ascending air. Having once made an outlet for itself the water is necessarily accelerated in velocity, so that before reaching the earth the stream may be pouring with irresistible force, cutting, when it strikes, the sharply marked and often deep chasms left by cloud bursts, especially on hill-sides.

When the ascending current carries the vapor into the region of frost—which is at a lower altitude within the gyrating funnel than outside of it—the condensed vapor is converted into hail. The small hailstones may then be kept suspended near the base of the cloud and enlarged by additions of freezing rain. In this way compact homogeneous hailstones of ordinary size are formed. At the height of 7,000 yards the air has lost more than half its density, yet an ascending velocity of twenty yards a second, which must be no unusual one in tornadoes, would sustain even at that altitude hailstones of considerable size. It is not necessary that the hailstones should remain in the freezing region a long time, or remain stationary. They may be carried from this vortex out where the ascending current is small, and dropping down some distance, may be carried into the vortex by inflowing currents and again thrown up to the region of frost. The nucleus of large hailstones is usually compacted snow. A small ball of snow saturated with rain is carried higher and freezes; and being of less specific gravity than compact hail it is kept where it receives a thick coating of ice from the unfrozen water dashed against it, and afterwards falls to the earth, either at a distance from the vortex where the ascending currents are weak, or near it after the uprush has been sufficiently exhausted. Sometimes, as in the case of the cloud burst, an almost incredible amount of accumulated hail may fall in a short time, when the energy of the system is suddenly spent.

The formation of large hailstones by concentric layers of clear ice and white snow, laid on like coats of an onion, will be readily understood from the foregoing. As many as thirteen layers have been observed in large hailstones, showing that they must have made half a dozen circuits, being successively thrown out of the frosty vortex above and sucked in below by the inflowing currents, each time adding to their coating of snow and ice before their final fall to earth.

When the tornado is very small in the area covered by the gyratory motion, a land spout or a water spout is formed, as it may happen to occur on land or at sea. In these the gyratory velocity rapidly diminishes with distance from the center. Their destructive effects are sudden and often great; but the area of violence is small. In the center of a waterspout, as in that of a tornado when in full force, no rain falls or water descends in any form, though a heavy shower often falls in the vicinity. On land dust and light substances are carried up, and as they are being collected from all sides by inflowing currents toward the vortex below, they assume the form of a cone, which meets the descending spout, falling apparently from the clouds, and thus give the whole phenomenon the appearance of an hour-glass.

The observed diameter of waterspouts range between two and two hundred feet or more, and their heights from thirty to fifteen hundred feet, sometimes very much more; but none of these observations can be regarded as at all exact. With a high temperature and a very low dew point Mr. Ferrel calculates that a water spout might reach a mile in height, but such conditions must occur rarely. Water spouts are often observed to drop down from a cloud in an incredibly short space of time, and to be drawn up again in the same manner; but this is all an illusion. When the gyrations are such as to not quite reduce the tension and temperature in the center, so as to condense the aqueous vapor and make it visible, a very slight increase at once reduces the temperature sufficiently, and the spout appears from top to bottom almost instantaneously. Just the reverse of this takes place, when the spout breaks, and it seems to be drawn up instantly; it is dissolved, not lifted. Tornadoes and waterspouts originate only in an unstable state of equilibrium of the air, which requires an unusually rapid decrease of temperature with increase of altitude. This can take place only when the strata nearest the earth are unusually heated; accordingly they never occur at night or in the winter, and but rarely in cloudy weather. If any agitation of the air, such as that arising from the discharge of cannon, tends to break up these meteors, then any considerable disturbance of the air from any cause must tend to prevent their formation. Hence they occur at sea and on the lakes only when there is little or no wind.

White squalls and invisible spouts. In such cases the dew point is so low, and the cloud when formed so high, that the gyrations are invisible. Still the gyrations and the rapidly ascending current in the central part are there,

and also the rising and the boiling of the sea. Over the boiling sea, high up in the air, is a patch of white cloud, formed by the condensation of the vapor when it reaches the required height. The bulls-eye spouts on the west coast of Africa are of precisely the same nature. In these cases the air is too dry to furnish the cloud necessary to make the spout, or center of the gyratory movement, visible.

In hot, dry climates these ascending whirls of air form sand spouts or pillars of sand. Both water spouts and sand spouts are hollow. —*Scientific American*.

The Story of a Tame Walrus.

The Spanish bark *Ogalla*, from Liverpool, now lying at Welch, Rithet & Co.'s wharf, has on board a tame walrus or sea lion. This animal was captured by Captain de Abortiz thirteen years ago while cruising in Behring Straits. It was then "a pup," was trained by him, and has been his constant companion on all his voyages ever since. He is called "Senor," and answers to his name or to a blast from a silver whistle blown by his master; but if blown by any one else he pays not the slightest attention to the call. He eats bread and meat, enjoys tea and tobacco. He is as passionately fond of beer as an old toper, and on many occasions has become gently "tight" from imbibing too heavily. When caught he weighed nineteen pounds, but he now turns the scale at 411 pounds, has two enormous tusks, measures six feet three inches at the girth, and is eight feet four inches long. As the Captain good-naturedly remarked, as he showed the brute to a few visitors, he is becoming "one big noose." In bright weather he sleeps in the sun on deck. During heavy blows he resorts to a kennel, but when the weather is calm he leaps overboard and sports about the ship for hours, catching and eating fish. When tired of swimming he is hauled on board in a great iron basket. On one occasion, off the Cape of Good Hope, a great shark tackled Senor, laying hold of one of his paws and biting off two of his toes, but Senor dove, and coming up under his enemy's belly, ripped him up with one thrust of his great tusks, and devoured him with savage cries of delight and satisfaction. He is very fond of the Captain, and when the latter has been absent from the ship for a day or two he manifests his uneasiness by a thundering noise not unlike the sounds that might be emitted by two or three scores of dogs barking in chorus. Senor is perfectly docile, allows himself to be patted on the head, and is very susceptible to kindness. —*Victoria (British Columbia) Colonist*.

Artemus Ward as a Boy.

Waterford, Me., is full of recollections of Charles Brown's boyish pranks, and his fellow-townsmen take pride in relating them, though time was when they caused not a little ominous shaking of the older heads, bringing forth repeatedly the prediction that he would never come to any good. One of his earliest exploits was the organizing of a circus—that moral institution dear to the heart of the small boy. Dressed in one of his mother's gowns, his head ornamented with her best bonnet, the future "genial showman" acted as clown, ring master and manager-in-chief, with his village cronies as assistants. His father's red cow, covered with blankets and provided with a stuffed coat-sleeve for a trunk, served as the elephant, and by long and careful training was brought into the ways of the circus trick-mule. The occasion of all others was the initiating of some country greenhorn into the mysteries of the "show business," by permitting him to ride the elephant. When such a youth was found and brought in, he was placed on the back of the animal with great ceremony, to be as surely tossed "sky high." Upon this, Charles would express the greatest surprise that the elephant should act so, and would commiserate the poor victim with much concern. (Charles continued all his life a friend and patron of the circus.) —*Scribner's Monthly*.

—A gentleman at Dubuque, Iowa, had a rattlesnake, a blue racer, and a garter snake in a box, all three coiled lovingly together and in a comatose state. Their bodies were as hard as rocks, and they appeared as though all life had been frozen out of them. The warm sunshine soon revived them, and the rattler showed signs of crawling out of his old coat, the new dress of yellow shining through the dried and worn one. The gentleman threw a shovel full of snow over the reptiles, and they instantly straightened out as stiff and apparently as dead as any other defunct snakes. By applying some warmth again they became as animated and dangerous as ever.

—"Thou rainest on my bosom," sung the Earth to the April showers. "Oh, dry up!" growled the Sun, as he shone out from behind the clouds. No music in his Sol.

Curious Flying-Machines.

A description of Dr. Daniel Asbury's flying machine is now "going the rounds of the press." This, the latest invention, is not dissimilar to many other contrivances of the sort. There are sixty-five flying machines patented at the Patent Office, and the case devoted to the original drawings describing them is one of the most curious in the building. A. M. Quinby, of Wilmington, Del., has been very fertile and persevering in designs. He has three or four winged figures which remind the visitor of the apparition of Apollyon to Chastan, where the great Adversity straddles quite over the way. There shall be no further Pilgrim's Progress. Lamboley's flying machine is another singular winged apparatus. Mr. Greenough took out a patent for an ingenious kite-shaped machine, which seems to be based on scientific theories. A clumsy old-fashioned drawing depicts the plan of Chester W. Sykes or a marine balloon, which is a kind of mechanical flying fish, able to fly in air or float in water, as convenience dictates. Many of the patents evidently contemplate the navigation of the sea by means of machines which may safely be propelled in either element. One extraordinary design represents a full-rigged air ship which is to be raised into the atmosphere and there controlled in ship-fashion by rudders and propellers. As the gas chambers are in the hull of the ship, the thought is suggested that upon experiment the vessel would be found top-heavy, and that ere long the astonished denizens of earth and sea might be treated to the mirage, that would not be all a mirage, in the spectacle of a ship suspended upside down in the air.

The invention which has been shown to be of the most practical value is Ritchel's flying-machine, which was patented in 1878, and which has become more or less familiar to the public by the exhibitions given in various parts of the country. While this machine falls short of solving the baffling problem of aerial locomotion, it is so far successful that by it a person can raise himself from the ground and in a measure regulate his elevation and course.

Almost all flying machines are made on one of two plans: the imitation of the principles of marine locomotion; we have the fan or wing and the paddle-wheel or screw. Buoyancy is gained by the use of gas, save where, as in Greenough's kite, the attempt is made to make the air sustain the apparatus through an artificially established equilibrium of forces. The radical defect in most of the plans is the disproportion of the weight of the machine to the lifting power of gas and their great bulk, which would render them unmanageable in high and adverse winds, even were they found to work successfully in favoring circumstances. But while there is much to laugh at in these designs, they show a hopeful progress and justify the confidence felt by many persons versed in patents that aerial locomotion is feasible and soon to be realized. —*Washington Cor. N. Y. Post*.

Lettuce.

To grow crisp and tender head lettuce, the soil must be mellow and rich. One of the pleasant features of raising lettuce for home use is to have it come in succession, and this can only be attained by planting at different times, three or four weeks apart. The later crops come from sowing the seed in the open ground in some sheltered spot as early in the spring as it will do to work the ground. The seedbed should be made mellow and smooth, and the seed may be sown broadcast or in shallow drills, covered very lightly by raking over the bed with a wooden rake, drawing the rake in the direction of the drills. The latter method is preferable, from the fact that while the plants are small the spaces between the rows may be disturbed with a hoe, and the growth of the plants hastened, as well as the weeds kept down. Among the very best sorts for family use, one that is widely and favorably known is the Early Curled Simpson. This is a favorite with market gardeners, and is extensively grown in the vicinity of New York. When planted on rich ground it grows into a large head that on the table will be found crisp, tender and of good quality. Another and very excellent variety is the Hanson, which grows to a large size, forming a solid head, crisp and of fine flavor, and very popular among the consumers. Tennis Ball, Boston Market, Early Butter, and other sorts, are prized on the table when grown on ground that is in good heart. There is neither profit nor pleasure in attempting to grow lettuce on poor, thin soil. In planting in the garden set the lettuce one foot apart each way, and then keep the ground mellow and free from weeds. —*N. Y. Tribune*.

—Seventy years ago the first Christian baptism of a Hindoo took place. There are now in India, Burmah and Ceylon 500,000 native Christians.

—Prof. Grimmer says that within the next ten years this country is to lose 15,000,000 inhabitants by epidemic.

HUMOROUS.

—The Lowell *Citizen* has discovered that "L. S.," printed after the signatures on the blanks of legal documents means "Lick the Seal."

—"What is love?" asks an exchange. Love, my friend, is thinking that you and the girl can be an eternal picnic to each other. —*Salem Sunbeam*.

—"Fruit eaten at night is baneful." This is one of those wise axioms proved to be true by Adam. His trouble was caused by eating an apple after Eve. —*Boston Transcript*.

—We suppose that a great bore in well. A man is seasonably "witted" when he is clothed in a "pepper and salt" suit. —*Boston Courier*.

—Several brothers recently got into a quarrel over a pie, and the littler one felt less kindly toward the biggest, who took his part, than he did toward any of the others. —*Boston Post*.

—Six months ago a middle-aged man, a former resident of Gosper Swamp, had to borrow money to buy a burro to go to Santa Carrina Mountains prospecting. He sold, the other day, a mine for \$10,000, and has better mines still for sale. —*Arizona Paper*. Six months ago a Chicago man had to borrow money to go to Leadville. He sent the other day for more money to come home with. —*Chicago Tribune*.

—Jones says that there is one thing about which he and his wife can never agree. When he says a woman is homely, Mrs. J. always sees something interesting about her; and when he speaks of another as pretty, his helpmate will inevitably declare that she is positively ugly, or at least remark that she cannot for her part see where people's eyes are. Greater philosophers than Jones have pondered over this same problem during their whole lives, and died at last, leaving it unsolved. —*Boston Transcript*.

RELIGIOUS AND EDUCATIONAL.

—The itinerant ministry of the Methodist Church received over 700 preachers during 1880.

—Rev. G. W. Yancey, of Louisville, favors sensational sermons, for he says "a sermon to be worth anything must be sensational."

—The 5th of August has been set aside by the Methodists as a day of prayer especially designed to prosper their Ecumenical Conference.

—The University of Des Moines, Ia., a Baptist institution, has been reorganized, there being an entire change of the faculty. David F. Call is the new President, and he will also discharge the duties of the Professor of Mathematics and Social Science.

—In the midsummer term of the "School of Philosophy," at Concord, President Porter, of Yale, and President McCosh, of Princeton, will deliver lectures this year. Ralph Waldo Emerson has promised to read a paper on Carlyle, if his health will permit.

—There are at present 6,379 schools in Austria without teachers. Over 4,780 places have been temporarily filled with individuals who have received no suitable training; and 1,596 schools had to be closed altogether, as even these untrained individuals are beginning to become scarce.

—Brother Harrison, known as the "boy preacher," has concluded a revival season at Meriden, Conn., during which he has induced about one thousand one hundred persons to profess conversion. A book containing the life of this brother has recently been written by an evangelist named Davies, who says in his preface that he has submitted the pages to the young man in order to be certain as to the correctness of the statements made in them. These statements comprise some of the most wonderful religious exploits ever recorded.

His Modesty.

The other night a policeman observed a man hanging around the entrance to a Michigan Avenue hall in a queer sort of way, and he asked him if he belonged to the order then in session up stairs. The man replied that he did, and the officer inquired:

"Then why don't you go up?"
"Well, I was thinking of it."
"Haven't been expelled, have you?"
"Oh, no."
"Aren't afraid of anybody?"
"No."

"And you haven't lost your interest?"
"I might as well tell you," said the man after beating around awhile longer. "I went down to Toledo a few days ago, and somehow the story came back here that I was drowned. My lodge thereupon passed resolutions to the effect that I was honest, upright and liberal, and a shining ornament, and that what was its loss was my gain. I wasn't drowned, as you see; but I kind o' hate to walk in on 'em and bust those resolutions. I've tried it three times, and I can't get higher up than the fifth stair before I weaken." —*Det. Free Press*.